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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/809,407	03/26/2004	Katsumi Inukai	119263	7578

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EXAMINER	
ROTH, LAURA K	
ART UNIT	PAPER NUMBER
2852	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/13/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/809,407	INUKAI, KATSUMI	
	Examiner	Art Unit	
	Laura K. Roth	2852	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 January 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-7 and 9-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *7,9,13-15,17,19,21 and 23* is/are allowed.

6)☒ Claim(s) *1,3-6,10-12,16,18,20,22,24 and 25* is/are rejected.

7)☒ Claim(s) *5 and 11* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 7 December 2006 has been entered.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 4, 6, 16, 18, 24, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cao et al. (US 6,111,230) in view of Kishimoto (US 5,669,038).

Regarding claim 1, Cao et al. (US 6,111,230) teach a heating apparatus comprising: a heat unit that generates heat in response to energization (fig.1, #64); and an energization unit (fig.1) that supplies AC power (fig.1, #54) to the heat unit and energizes the heat unit discontinuously in a pulsatile manner at least when energization of the heat unit is started (fig.4, #170); wherein the energization unit turns on and off a control signal twice or more (fig.4, #150 and #170: the signal is on then off more than twice as two instances are shown and dots indicated the pattern continues) and sets an

on and off period defined by sum of an on time and an off time of the control signal to a period not matching an integral multiple of a half the period of the AC power (col.10, ln.27-45; col.10, ln.61 to col.11, ln.3); and wherein the energization unit is configured to stop energizing the heat unit when the control signal is off and when the voltage value of the AC power crosses zero (fig.4, #174 & #176: current reaches 0 when #150 is off and #100 crosses 0); and wherein the energization unit sets the on time of the control signal to a time not matching the time of an integral multiple of a half the period of the AC power supply (col.10, ln.62-col.11, ln.43; also fig.4: frequency is 60Hz, so half a period will equal 8,333 μs, the time of an ON signal is ~1msec, which is 1,000 μs, thus it is not an integer multiple of the half period).

Regarding claim 4, Cao et al. (US 6,111,230) teach a heating apparatus wherein the energization unit sets the off time of the control signal to a time not matching the time of an integral multiple of a half the period of the AC power supply (col.10, ln.27-45; col.10, ln.61 to col.11, ln.3: 10.3 msec is not an integer multiple of the half period).

Regarding claim 6, Cao et al. (US 6,111,230) teach a heating apparatus wherein the energization unit prolongs the on time of the control signal with the passage of time from the energization start time (fig.4, second delay is shorter therefor the on time of the heater is longer).

Regarding claim 16, Cao et al. (US 6,111,230) teach a heating apparatus further comprising a CPU turning on and off the control signal (fig.1, #30).

Regarding claim 18, Cao et al. (US 6,111,230) teach an image formation apparatus (col.4, ln.10-22), comprising: a heat unit that generates heat in response to

energization (fig.1, #64) to heat a toner image formed on a recording medium for fixing the toner image on the recording medium; and an energization unit (fig.1) that supplies AC power (fig.1, #54) to the heat unit and energizes the heat unit discontinuously in a pulsatile manner at least when energization of the heat unit is started (fig.4, #170); wherein the energization unit turns on and off a control signal twice or more (fig.4, #150 and #170: the signal is on then off more than twice as two instances are shown and dots indicated the pattern continues) and sets an on and off period defined by sum of an on time and an off time of the control signal to a period not matching an integral multiple of a half the period of the AC power (col.10, ln.27-45; col.10, ln.61 to col.11, ln.3); and wherein the energization unit is configured to stop energizing the heat unit when the control signal is off and when the voltage value of the AC power crosses zero (fig.4, #174 & #176: current reaches 0 when #150 is off and #100 crosses 0); and wherein the energization unit sets the on time of the control signal to a time not matching the time of an integral multiple of a half the period of the AC power supply (col.10, ln.62-col.11, ln.43; also fig.4: frequency is 60Hz, so half a period will equal 8,333 μs, the time of an ON signal is ~1msec, which is 1,000 μs, thus it is not an integer multiple of the half period).

Regarding claim 24, Cao et al. (US 6,111,230) teach a heating apparatus comprising: a heat unit that generates heat in response to energization (fig.1, #64); and an energization unit (fig.1) that supplies AC power (fig.1, #54) to the heat unit and energizes the heat unit discontinuously in a pulsatile manner at least when energization of the heat unit is started (fig.4, #170); wherein the energization unit turns on and off a

control signal twice or more (fig.4, #150 and #170: the signal is on then off more than twice as two instances are shown and dots indicated the pattern continues) and sets an on and off period defined by sum of an on time and an off time of the control signal to a period not matching an integral multiple of a half the period of the AC power (col.10, ln.27-45; col.10, ln.61 to col.11, ln.3); and wherein the energization unit is configured to stop energizing the heat unit when the control signal is off and when the voltage value of the AC power crosses zero (fig.4, #174 & #176: current reaches 0 when #150 is off and #100 crosses 0); and wherein a sum of an on time and an off time of the control signal is longer than a half the period of the AC power (col.10, ln.62-col.11, ln.43; also fig.4: frequency is 60Hz, so half a period will equal 8,333 μs, the time of an ON signal is ~1msec, which is 1,000 μs, and the OFF time is 113 clicks, where one click is defined as 68.69 μs, which is equal to 7,761.97 μs; therefore the sum of the ON and the OFF is 1,000 μs + 7,761.97 μs = 8,761.97 μs, which is more than the half period).

Regarding claim 25, Cao et al. (US 6,111,230) teach an image formation apparatus (col.4, ln.10-22), comprising: a heat unit that generates heat in response to energization (fig.1, #64) to heat a toner image formed on a recording medium for fixing the toner image on the recording medium; and an energization unit (fig.1) that supplies AC power (fig.1, #54) to the heat unit and energizes the heat unit discontinuously in a pulsatile manner at least when energization of the heat unit is started (fig.4, #170); wherein the energization unit turns on and off a control signal twice or more (fig.4, #150 and #170: the signal is on then off more than twice as two instances are shown and dots indicated the pattern continues) and sets an on and off period defined by sum of an

on time and an off time of the control signal to a period not matching an integral multiple of a half the period of the AC power (col.10, ln.27-45; col.10, ln.61 to col.11, ln.3); and wherein the energization unit is configured to stop energizing the heat unit when the control signal is off and when the voltage value of the AC power crosses zero (fig.4, #174 & #176: current reaches 0 when #150 is off and #100 crosses 0); and wherein a sum of an on time and an off time of the control signal is longer than a half the period of the AC power (col.10, ln.62-col.11, ln.43; also fig.4: frequency is 60Hz, so half a period will equal 8,333 μs, the time of an ON signal is ~1msec, which is 1,000 μs, and the OFF time is 113 clicks, where one click is defined as 68.69 μs, which is equal to 7,761.97 μs; therefore the sum of the ON and the OFF is 1,000 μs + 7,761.97 μs = 8,761.97 μs, which is more than the half period).

However, Cao et al. (US 6,111,230) fail to teach an energization unit configured to energize the heat unit when a control signal is on and when a voltage value of an AC power crosses zero.

Regarding claims 1 and 24, Kishimoto (US 5,669,038) teaches a heating apparatus wherein an energization unit is configured to energize the heat unit when a control signal is on and when a voltage value of an AC power crosses zero (col.2, ln.25-28).

Regarding claims 18 and 25, Kishimoto (US 5,669,038) teaches a heating apparatus wherein an energization unit is configured to energize the heat unit when a control signal is on and when a voltage value of an AC power crosses zero (col.2, ln.25-28).

It would have been obvious to one of ordinary skill in the art at the time of invention to modify the heating apparatus of Cao et al. (US 6,111,230) by configuring it to turn on when the ON signal and a zero crossing point coincide as in Kishimoto (US 5,669,038) to provide a system with a low rush current when the heater current is activated, preventing unnecessary flicker (col.2, ln.22-ln.40) and to avoid detrimental harmonic current and contact noise that arises from beginning the heater at a point mid-wave as disclosed by Nishida (US Pub. 2003/0072581) (para.0007).

Claims 10,12, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cao et al. (US 6,111,230) in view of Kishimoto (US 5,669,038) as applied to claims 1 and 7 above, and further in view of Mine (US 6,157,010).

Regarding claim 10, Cao et al. (US 6,111,230) teach an integrated control unit (fig.1, #30).

Regarding claim 20, Cao et al. (US 6,111,230) teach wherein the integrated control unit controls the energization unit so as to turn on and off the control signals twice or more (fig.4, #150 and #170: the signal is on then off more than twice as two instances are shown and dots indicated the pattern continues).

However, neither Cao et al. (US 6,111,230) nor Kishimoto (US 5,669,038) teach a plurality of heat units, a plurality of energization units or controls therefor.

Regarding claim 10, Mine (US 6,157,010) teaches a heating apparatus comprising: an integrated control unit (fig.7, 12); wherein the heat unit includes a plurality of heat units each provided with the energization unit (fig.7, #3a and #3b); the

energization unit includes a plurality of energization units (fig.7, #11a and #11b) and the integrated control unit controls the plurality of energization units so that discontinuing the on state results in the control signals generated by the plurality of energization units being superposed in a pulsatile current (see fig.10B with respect to fig.10E).

Regarding claim 12, Mine (US 6,157,010) teaches a heating apparatus wherein the integrated control unit further controls the plurality of energization units so as to turn on and off the control signals in order (see fig.10B with respect to fig.10E).

Regarding claim 22, Mine (US 6,157,010) teaches a heating apparatus wherein the integrated control unit controls the plurality of energization units so as to turn and off, during a time from off timing of either one of control signals to on timing of the control signal, each one of the other control signals once (fig.10B and fig.10E: ton2 ends at the end of the period toff1).

It would have been obvious to one of ordinary skill in the art at the time of invention to modify the apparatus of Cao et al. (US 6,111,230) in view of Kishimoto (US 5,669,038) by including a plurality of heaters and energization units and incorporating sequenced controls therefor as seen in Mine (US 6,157,010) in order to be able to uniformly heat an entire roller in order to handle papers of a wide range of sizes (col.10, ln.21-25) and to still achieve the benefits derived from the pulse controls of Cao et al. (US 6,111,230).

Allowable Subject Matter

Claims 7, 9, 13-15, 17, 21, 23, and 19 are allowed.

Claims 5, and 11 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

- Prior art does not disclose or suggest the claimed "sets the off time of the control signal to a time one to six times the time of a half the period" in combination with the remaining claim elements as set forth in claim 5.
- Prior art does not disclose or suggest the claimed "determines whether to switch on/off the control signal on the basis of the counted number" in combination with the remaining claim elements as set forth in claims 7, 9, 13-15, 17, 21, 23, and 19.
- Prior art does not disclose or suggest the claimed matching of periods and phases in combination with the remaining claim elements as set forth in claim 11.

Response to Arguments

The previously indicated allowability of originally presented, currently cancelled claim 2 has been withdrawn in light of matters in the references as cited in the amended rejections of claims 1 and 18, to which the subject matter of claim 2 had been added.

Regarding the alleged patentability of newly submitted claims 24 and 25, as discussed in the Interview on 17 November 2006, subject matter illustrated in

applicant's figure 6 of the present application appears to illustrate subject matter not contained within the applied references; however, the current language of claims 24 and 25 do not accurately convey the controls illustrated in fig.6.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Laura K. Roth whose telephone number is (571)272-2154. The examiner can normally be reached on Monday-Friday, 7:30 am to 3:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David M. Gray can be reached on (571)272-2119. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

LKR
3/9/2007

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SUPERVISORY PATENT EXAMINER